

# OPERATING INSTRUCTIONS CH403



36 x 72

## SPECIFICATIONS

### SETPOINT LIMITS

Product	Resolution (°C / °F)	Range
CH403	1	-50 to 100°C -50 to 210°F
	0.1	-19.0 to 99.0 °C / °F

### DISPLAY

3 digits : 0.4", Bright Red LED's.

### SENSOR TYPE

NTC probe TSP04

### CONTROL ACTION

ON/ OFF with hysteresis programmable  
from 0.1 to 9.9 (°C / °F)

### DISPLAY OFFSET ADJUSTMENT

-19.9 to 20.0 (°C / °F)

### RESTART TIME DELAY

Adjustable from 00 to 99 minutes.

### ACCURACY

±1% (full scale)

### SETTINGS

Via keys on front panel

### RELAY ACTION

a) Heat mode b) Cool mode

### SENSOR BREAK

[PB] indicated on display, relay off

### ALARM INDICATIONS

- a) High Alarm: display alternates between 'HA' / 'PV' value
- b) Low Alarm: display alternates between 'LA' / 'PV' value

### OUTPUT

**For main set point:**

SPST, 10A @230 VAC.

SSR drive available on request.

20A relay models available.

**For Alarm:** 12VDC @ 10mA.

5A relay models available on request.

### DEFROST TIME

Programmable from 00 to 99 min

### DEFROST FREQUENCY

Programmable from 00 to 99 (hr / min / sec)

### POWER SUPPLY

85 to 270 VAC/ DC @ 50/ 60 Hz

24VAC /DC models (Available on request)

### OPERATING TEMPERATURE

0-50°C

### HUMIDITY

95% RH

### HOUSING

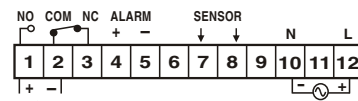
Flame retardant engineering plastic

### WEIGHT

110 gms

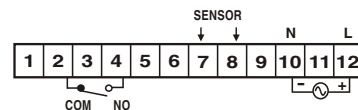
## TERMINAL CONNECTIONS

### CH403-1



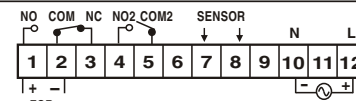
TERMINAL	TERMINAL DESCRIPTION
7 & 8	Sensor input
1	NO of relay / +ve of SSR
2	COM of relay / - ve of SSR
3	NC of relay
4	+ve of alarm output
5	- ve of alarm output
10	N (Neutral)
12	L (Live)

### CH403-2



TERMINAL	TERMINAL DESCRIPTION
4	NO of relay
2	COM of relay
7 & 8	Sensor input
10	N (Neutral)
12	L (Live)

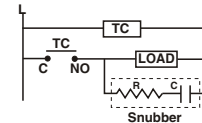
### CH403-3



TERMINAL	TERMINAL DESCRIPTION
7 & 8	Sensor input
1	NO of relay / +ve of SSR
2	COM of relay / - ve of SSR
3	NC of relay
4	+ve of alarm output / NO2
5	- ve of alarm output / COM2
10	N (Neutral)
12	L (Live)

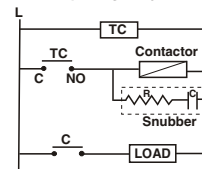
## TYPICAL CONNECTIONS FOR LOADS

### 1) For load current less than 0.5A



OR

### 2) For bigger loads use interposing relay/contactors



**NOTE:** Use snubber as shown above to increase life of internal relay of temperature controller.

## SAFETY SUMMARY

All safety related codifications, symbols and instructions that appear in this operating manual or on the equipment must be strictly followed to ensure the safety of the operating personnel as well as the instrument.

If the equipment is not handled in a manner specified by the manufacturer it might impair the protection provided by the equipment.

**CAUTION:** Read complete instructions prior to installation and operation of the unit.

**CAUTION:** Risk of electric shock.

## WIRING GUIDELINES

### CAUTION:

- To prevent the risk of electric shock power supply to the equipment must be kept OFF while doing the wiring arrangement. Use lugged terminals to meet M3 screws.
- Wiring shall be done strictly according to the terminal layout with shortest connections. Confirm that all connections are correct.
- To eliminate electromagnetic interference use of short wire with adequate ratings and twists of the same in equal size shall be made.
- Cable used for connection to power source, must have a cross section of 1mm<sup>2</sup> or greater. These wires shall have insulation capacity made of at least 1.5KV.

## INSTALLATION GUIDELINES

### CAUTION:

- This equipment, being built-in-type, normally becomes a part of main control panel and in such case the terminals do not remain accessible to the end user after installation and internal wiring.
- Conductors must not come in contact with the internal circuitry of the equipment or else it may lead to a safety hazard that may in turn endanger life or cause electrical shock to the operator.
- Circuit breaker or mains switch must be installed between power source and supply terminals to facilitate power 'ON' or 'OFF' function. However this switch or breaker must be installed in a convenient position normally accessible to the operator

### CAUTION:

- The equipment shall not be installed in environmental conditions other than those mentioned in this manual.

### Fuse Protection:

The equipment does not have a built-in-type fuse. Installation of external fuse of rating 275VAC/1Amp for electrical circuitry is highly recommended.

- Thermal dissipation of equipment is met through ventilation holes provided on chassis of equipment. Such ventilation holes shall not be obstructed else it can lead to a safety hazard.

- The output terminals shall be strictly loaded to the manufacturer specified values/range.

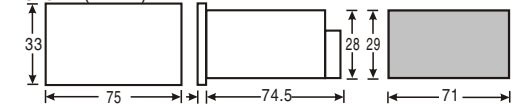
## MAINTENANCE

- The equipment should be cleaned regularly to avoid blockage of ventilating parts.
- Please clean the equipment with a clean soft cloth. Do not use Isopropyl alcohol or any other cleaning agent.

## MECHANICAL INSTALLATION

For installing the controller

- Prepare the panel cutout with proper dimensions as shown (in mm)



- Push the controller into the panel cutout. Secure the controller in its place by pushing the clamp on the rear side. The screws of the clamp, must be in the farthest forward slot.
- For proper sealing, tighten the screws evenly with required torque.

### CAUTION:

The equipment in its installed state must not come in close proximity to any heating sources, caustic vapors, oils, steam, or other unwanted process by-products.

### EMC Guidelines:

- Use proper input power cables with shortest connections and twisted type.
- Layout of connecting cables shall be away from any internal EMI source.

## CONFIGURATION SCHEME (parameter setting)

To enter configuration: Press **▲** & **▼** for 3 seconds

Key press	Display	Description
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### 1. To Lock setpoint Factory setting: 0

(Display <b>LCE</b> for 1 second)		
SETPOINT	<b>0</b>	Unlock
Press <b>■</b> + <b>▲</b> / <b>▼</b>	<b>1</b>	Lock

### 2. To select Resolution Factory setting: 1

(Display <b>RES</b> for 1 second)		
RESOLUTION	<b>1</b>	
Press <b>■</b> + <b>▲</b> / <b>▼</b>	<b>0.1</b>	

### 3. To select Control mode Factory setting: Cool

(Display <b>CNE</b> for 1 second)		
MODE	<b>CL</b>	Cool mode
Press <b>■</b> + <b>▲</b> / <b>▼</b>	<b>HE</b>	Heat mode

### 4. To select High Alarm Factory setting: 100°C

(Display <b>HA</b> for 1 second)		
HIGH ALARM	<b>100</b>	SP to 100°C SP to 99°C (for 0.1 resolution)
Press <b>■</b> + <b>▲</b> / <b>▼</b> to change value		

### 5. To select Low Alarm Factory setting: -50 °C

(Display <b>LA</b> for 1 second)		
LOW ALARM	<b>-50</b>	-50°C to SP -19°C to SP (for 0.1 resolution)
Press <b>■</b> + <b>▲</b> / <b>▼</b> to change value		

Key press	Display	Description
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### 6. To select Hysteresis Factory setting: 0.5

(Display <b>HYS</b> for 1 second)		
HYSTERESIS	<b>0.5</b>	0.1 to 9.9
Press <b>■</b> + <b>▲</b> / <b>▼</b> to change value		

### 7. To select Display Offset Factory setting: 0.0

(Display <b>OFS</b> for 1 second)		
DISPLAY OFFSET	<b>00.0</b>	-19.9 to 20.0
Press <b>■</b> + <b>▲</b> / <b>▼</b> to change value		

### 8. To select Restart time delay Factory setting: 00

(Display <b>dt</b> for 1 second)		
RESTART TIME	<b>00</b>	00 to 99 min
Press <b>■</b> + <b>▲</b> / <b>▼</b> to change value		

### 9. To select Defrost time Factory setting: 00min

(Display <b>dft</b> for 1 second)		
DEFROST TIME	<b>00</b>	00 to 99 min
Press <b>■</b> + <b>▲</b> / <b>▼</b> to change value		

### 10. To select Defrost Frequency Factory setting: 1

NOTE : This parameter will be prompted only if Defrost time (DFT) > 0

(Display <b>dff</b> for 1 second)		
DEFROST FREQUENCY	<b>01</b>	00 to 99 units
Press <b>■</b> + <b>▲</b> / <b>▼</b> to change value		

### 11. To select Defrost Frequency unit Factory setting: Hours

NOTE : This parameter will be prompted only if Defrost time (DFT) > 0

(Display <b>dfu</b> for 1 second)		
DEFROST FREQUENCY UNIT	<b>H</b>	Hours
Press <b>■</b> + <b>▲</b> / <b>▼</b>	<b>M</b>	Minutes
Press <b>■</b> + <b>▲</b> / <b>▼</b>	<b>S</b>	Seconds

Key press	Display	Description
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### 12. To select Audible Alarm Factory setting: Mute

NOTE: Not prompted for 20A relay models

(Display <b>AL</b> for 1 second)		
Audible Alarm	<b>0</b>	Mute
Press <b>■</b> + <b>▲</b> / <b>▼</b>	<b>1</b>	Enable

### 13. To select Units Factory setting: °C

UNIT	<b>UNt</b>	
Press <b>■</b> + <b>▲</b> / <b>▼</b>	<b>oC</b>	Celsius
	<b>oF</b>	Fahrenheit

### 14. To select Sensor Break Factory setting: 0

(Display <b>Sbr</b> for 1 second)		
Sensor Break	<b>0</b>	Relay OFF
Press <b>■</b> + <b>▲</b> / <b>▼</b>	<b>1</b>	10 min OFF, 4 min ON (Off first)

### 15. Press **▲** to select Reset all

At display = 5, reset all to Factory setting value  
Note: Reset all function to be used prior to changing input (to realign related parameters)

(Display <b>rse</b> for 1 second)		
RESET ALL	<b>0</b>	No reset
Press <b>■</b> + <b>▲</b>	<b>1</b>	No reset
Press <b>■</b> + <b>▲</b>	<b>2</b>	No reset
Press <b>■</b> + <b>▲</b>	<b>3</b>	No reset
Press <b>■</b> + <b>▲</b>	<b>4</b>	No reset
Press <b>■</b> + <b>▲</b>	<b>5</b>	All reset

### After configuration setting:

Press **▲** & **▼** for 3 secs to exit programming mode

NOTE: No keys pressed in programming mode allows to quit automatically from programming after 1 min

## Programming Set Point

A) To view set point : Press **■** key

B) To increase / decrease set point : Press **■** + **▲** / **▼**

Continuous operation of above makes update speed faster in 3 stages after 7 seconds.

Range: From user programmed Low alarm (LA) to High alarm (HA).

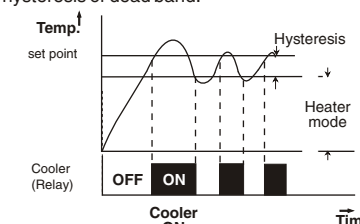
Resolution: 1 / 0.1 programmable.

Default: 0 °C

## USER GUIDE :

**1) ON/OFF control action (for cooler) :** The relay is 'OFF' up to a temperature equivalent to SETPOINT + HYST and 'ON' above this temperature. As the temperature of the system drops, the relay is switched 'OFF' at SETPOINT.

**Hysteresis:** The difference between the temperature at which relay switches 'ON' and at which relay switches 'OFF' is the hysteresis or dead band.



**2. Display Offset adjustment:** This function is used to adjust the display value in cases where it is necessary for display value to agree with another recorder or indicator, or when the sensor cannot be mounted in correct location.

**3. Defrost mode:** The unit has two modes of defrost - Auto and Manual. The Auto mode can be set by programming required defrost frequency between 0 and 99 (Hr / Min / Sec). The defrost frequency excludes the defrost time. To enable Manual defrost press key **▼** continuously for 4 sec. Defrost is valid only for cool mode. During defrost relay remains OFF for a period = Programmed defrost time. Defrost once enabled can be disabled only at power ON. Defrost is disabled if Defrost frequency = 0 or Defrost time = 0.

**4. Restart time delay:** This parameter is used to protect the compressor from restarting in a short period of time and can be set between 0 to 99 minutes.

**Example:** If this parameter is set at 2 mins, the relay will cut off at the set temperature, but will not restart for a minimum of 2 mins, even if the differential is achieved earlier.

**5. Alarm acknowledgement :** To acknowledge the alarm, press **▲** key.

(Specifications subject to change as development is a continuous process)

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Operating/1005/CH403/OP161-V03B

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